Measurment of snow distribution using small UAV

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Recently aerial photography using small UAV (Unmanned Aerial Vehicle) carrying a compact camera and SfM (Structure from Motion) technique has been carried out in many areas. As one of the advantages of the small-multicopter survey it can closely shoot and measure the mountain slope where the existing manned airplane cannot survey enough because its flight height is relatively high and so it cannot come close to the object. In addition, because running cost of the small UAV survey is far less and its operation is relatively easy, repetitive measurements are easier than the existing methods such as aerial photogrammetry and laser scanning with a manned airplane. We have carried out the topographic measurements using the above advantages at snow covered area in Niigata Prefecture, Japan. By the repetitive UAV measurements we have constructed the multi-temporal 3D models of the surfaces of the ground and snow field and could quantitatively clarify the snow distribution with higher spatial and temporal resolutions. The snow-depth values estimated by the UAV surveys corresponded reasonably well with the actual data measured by snow probe. The UAV-SfM technique has a great potential for a wide range of application, because of its high data accuracy, low initial and operational costs, allowing high spatial and temporal data recording.

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